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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Guido Canzona

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12/01/2006

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EXAMINER

KESSLER, CHRISTOPHER S

ART UNIT

PAPER NUMBER

1742

DATE MAILED: 12/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding..

Office Action Summary

Application No.

10/789,709

Applicant(s)

CANZONA ET AL.

Examiner

Christopher Kessler

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 September 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 33 and 34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
- Paper No(s)/Mail Date 2/27/04

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Status of Claims

Claims 33 and 34 are withdrawn from further consideration pursuant to 37 CFR

1.142(b) as being drawn to a nonelected group, there being no allowable generic or linking claim. Election was ^{treated as} ~~made~~ without traverse in the reply filed on 9/11/06.

Therefore, claims 1-32 are currently under examination.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 5, 9, and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 5745834 issued to Bampton et al. (hereinafter "Bampton '834").

3. Regarding claim 1, Bampton '834 anticipates Applicant's invention. Bampton '834 teaches providing a powder blend which comprises a powdered parent metal alloy, a powdered lower-melting-temperature alloy that comprises greater than 10% of the total weight, and a polymer (see col. 3, line 42-col. 4, line 29). Bampton '834 teaches that the polymer component comprises 5-15% by volume of the powdered blend (see col. 3, line 42-col. 4, line 29). Because of the significant overlap in applicant's claimed range of less than 3 weight percent, and because Bampton '834 explicitly teaches the advantages of minimizing the volume of binder for sintering (see col. 4, line 57-col. 5, line 12), Bampton '834 discloses a range with sufficient specificity to anticipate Applicant's claimed range (see MPEP 2131.03).

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Bampton further teaches performing a layer-building operation and sintering according to a CAD design (see col. 4, line 30-col. 5, line 12).

Bampton further teaches placing the green part into vacuum furnace to remove the polymer, and then to conduct transient liquid phase sintering to near full density (see col. 5, line 13-col. 7, line 23). The Examiner interprets that "near full density" exceeds 96% relative density.

5. Regarding claim 5, Bampton '834 discloses a SLS operation (see abstract).

6. Regarding claim 9, Bampton '834 discloses wherein the metal powders have an average particle size of 25-55 μm (see col. 4, lines 6-10). Metal particles with an average particle size of about 35 μm would pass through a 400 mesh sieve, for example. Because Bampton '834 explicitly teaches the advantages of having a powder with good flowability, (see col. 4, line 57-col. 5, line 12), Bampton '834 discloses a range with sufficient specificity to anticipate Applicant's claimed range (see MPEP 2131.03).

7. Regarding claim 32, Bampton '834 discloses wherein metal parts are made by the process (see paragraph 0023).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

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the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 2-4, 6-8, 12-20, 22, and 24-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bampton '834 in view of US Patent 6,365,093 issued to Ryang et al. (hereinafter Ryang '093).

10. Regarding claim 2, Bampton '834 is applied to the claims as stated in the rejection of independent claim 1. Bampton '834 does not teach using a mixture of two polymers. Ryang '093 teaches a method of SLS using a mixture of a thermoplastic and thermoset component as the polymer binder in order to enhance strength (see Example 4).

It would have been obvious to one of ordinary skill in the art at the time invention was made to use the mixed polymer binder taught by Ryang '093 in the invention of Bampton '834 in order to create a green body strong enough to avoid cracking before the sintering step in a single process, as taught by Ryang '093 (see Example 4).

11. Regarding claim 3, Bampton '934 and Ryang '093 are applied to the claim as stated above.

12. Regarding claim 4, Bampton '834 discloses a SLS operation (see abstract).

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13. Regarding claim 6, Bampton '834 discloses wherein the metal particles pass through a 325 mesh screen (see col. 4, lines 6-10), meaning also that the same particles would pass through a 270 mesh screen (see MPEP 2144.05).
14. Regarding claim 7, Bampton '834 discloses wherein the metal particles pass through a 325 mesh screen (see col. 4, lines 6-10), meaning also that the same particles would pass through a 140 mesh screen (see MPEP 2144.05).
15. Regarding claim 8, Bampton '834 discloses wherein the metal particles pass through a 325 mesh screen (see col. 4, lines 6-10). (See also MPEP 2144.05.)
16. Regarding claim 12, Bampton '834 discloses the use of boron to lower melting temperature of the metal of the lower melting temperature alloy (see col. 3, line 51-col. 4, line 18).
17. Regarding claim 13, Bampton '834 discloses the use of boron to lower melting temperature of the metal of the lower melting temperature alloy (see col. 3, line 51-col. 4, line 18).
18. Regarding claim 14, Bampton '834 discloses the use of nickel alloy (see col. 3, line 51-col. 4, line 18).
19. Regarding claim 15, Bampton '834 discloses the use of nickel alloy (see col. 3, line 51-col. 4, line 18).
20. Regarding claim 16, Bampton '834 discloses the use of 230 alloy (see col. 3, line 51-col. 4, line 18).
21. Regarding claim 17, Bampton '834 teaches that the polymer component comprises 5-15% by volume of the powdered blend (see col. 3, line 42-col. 4, line 29).

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Bampton '834 further teaches the advantages of minimizing the volume of binder for sintering (see col. 4, line 57-col. 5, line 12). The range of 2% polymer by weight would be optimized by one of ordinary skill in the art through routine experimentation (see MPEP 2144.05).

22. Regarding claim 18 Bampton '834 teaches that the polymer component comprises 5-15% by volume of the powdered blend (see col. 3, line 42-col. 4, line 29). Bampton '834 further teaches the advantages of minimizing the volume of binder for sintering (see col. 4, line 57-col. 5, line 12). The range of 1% polymer by weight would be optimized by one of ordinary skill in the art through routine experimentation (see MPEP 2144.05).

23. Regarding claim 19, Bampton '834 teaches that the polymer component comprises 5-15% by volume of the powdered blend (see col. 3, line 42-col. 4, line 29). Bampton '834 further teaches the advantages of minimizing the volume of binder for sintering (see col. 4, line 57-col. 5, line 12). The range of 0.5% polymer by weight would be optimized by one of ordinary skill in the art through routine experimentation (see MPEP 2144.05).

Further, no evidence is given regarding the criticality of that range of polymer, nor do Applicants disclose an example. Applicant discloses in paragraph 43 that the preferred embodiment includes 0.5% organic polymer. However, Figure 6 shows a composition comprising 0.5% N-12 and 0.5% BMI, for a total of 1%, with no examples given to demonstrate the criticality of the range claimed.

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24. Regarding claim 20, Bampton '834 does not disclose wherein the green body has a relative density of at least 58%. However, this property of the product made by the method claimed would have been inherent in the method, and therefore is not patentable over prior art (see MPEP 2112.01). The method of Bampton '834 altered to use the polymer binder of Ryang '093 would result in an inherently similar product.

25. Regarding claim 22, Bampton '834 and Ryang '093 are applied to the claims as stated above. Bampton discloses a nickel based alloy (see col. 3, line 51-col. 4, line 18).

26. Regarding claim 24, Bampton '834 and Ryang '093, are applied to the claim as stated above. Bampton '834 discloses wherein the parent metal alloy comprises a 230 alloy (see col. 3, line 51-col. 4, line 18).

27. Regarding claim 25, Bampton '834 discloses wherein the parent metal alloy comprises a 230 alloy (see col. 3, line 51-col. 4, line 18).

28. Regarding claim 26, Bampton '834 discloses a composition of 75-85% parent metal by volume, 5-15% of a lower melting temperature alloy and 5-15% polymer, said composition overlapping applicant's claimed range of at least 5:1 by weight and thus establishing a prima facie case of obviousness (see MPEP 2144.05).

29. Regarding claim 27, Bampton '834 discloses a composition of 75-85% parent metal by volume, 5-15% of a lower melting temperature alloy and 5-15% polymer, said composition overlapping applicant's claimed range of at least 10:1 by weight and thus establishing a prima facie case of obviousness (see MPEP 2144.05).

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30. Regarding claim 28, Bampton '834 discloses a composition of 75-85% parent metal by volume, 5-15% of a lower melting temperature alloy and 5-15% polymer, said composition overlapping applicant's claimed range of at least 30:1 by weight and thus establishing a prima facie case of obviousness (see MPEP 2144.05).

31. Regarding claim 29, Bampton '834 is applied to the claims as stated above. Bampton '834 teaches to sinter the green part in a recirculating gas which "should be selected so as not to hinder (and preferably to enhance) the transient liquid sintering process" (see col. 5, line 59-col. 6, line 8). Ryang also teaches that an inert atmosphere is beneficial for the reduction of carbon (see col. 3, lines 16-41). Bampton further discloses an example of a mixture of nitrogen and hydrogen (see col. 5, line 59-col. 6, line 8). Nitrogen meets the definition of an inert gas. The ratio of no greater than about 19:1 would have been optimized by one of ordinary skill in the art through routine experimentation (see MPEP 2144.05).

32. Regarding claim 30, Bampton discloses an example of a mixture of nitrogen and hydrogen (see col. 5, line 59-col. 6, line 8). Nitrogen meets the definition of an inert gas. The ratio of no greater than about 19:1 would have been optimized by one of ordinary skill in the art through routine experimentation (see MPEP 2144.05).

33. Regarding claim 31, Bampton '834 is applied to the claim as stated above. The Examiner notes that argon is recognized in the art as an equivalent for nitrogen, and that the substitution of argon in place of the nitrogen taught by Bampton '834 is not inventive (see MPEP 2144).

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34. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bampton '834 as applied to claim 1 above, and further in view of US Patent 5,932,055 issued to Newell et al. (hereinafter "Newell '055").

35. Regarding claim 10, Bampton '834 is applied to the claim as stated above. Bampton '834 nor does not disclose wherein the supersolidus liquid phase sintering takes place at temperatures from 2248-2267 °F. Newell '055 teaches that SLPS of a 230 alloy/borided 230 alloy mixture takes place preferably from 1200-1300 °C (see col. 7, lines 4-15). Newell '055 further teaches that equilibration of boron content occurs at 1235 °C (see Figure 3), thus establishing a *prima facie* case of obviousness for that range (see MPEP 2144.05).

It would have been obvious to one of ordinary skill in the art at the time invention was made to further limit the invention of Bampton '834 by heating the green body to a temperature of 1235°C, as taught by Newell '055 (cited above) in order to equilibrate boron, as taught by Newell '055, cited above.

36. Claims 11, 21, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bampton '834 and Ryang '093 as applied to claim 4 above, and further in view of US Patent 5,932,055 issued to Newell et al. (hereinafter "Newell '055").

37. Regarding claim 11, Bampton '834 and Ryang '093 are applied to the claim as stated above. Neither Bampton '834 nor Ryang '093 disclose wherein the supersolidus liquid phase sintering takes place at temperatures from 2248-2267 °F. Newell '055

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teaches that SLPS of a 230 alloy/borided 230 alloy mixture takes place preferably from 1200-1300 °C (see col. 7, lines 4-15). Newell '055 further teaches that equilibration of boron content occurs at 1235 °C (see Figure 3), thus establishing a *prima facie* case of obviousness for that range (see MPEP 2144.05).

It would have been obvious to one of ordinary skill in the art at time invention was made to use the mixed polymer binder taught by Ryang '093 in the invention of Bampton '834 in order to create a green body strong enough to avoid cracking before the sintering step in a single process, as taught by Ryang '093 (see Example 4), and to further heat the green body to a temperature of 1235°C as taught by Newell '055 (cited above) in order to equilibrate boron, as taught by Newell '055, cited above.

38. Regarding claim 21, Bampton '834 and Ryang '093 are applied to the claim as stated in the rejection of claims 4, 7, 12 and 11 above. Newell '055 is applied to the claim as stated in the rejection of claim 11 above.

39. Regarding claim 23, Bampton '834 and Ryang '093 are applied to the claim as stated in the rejection of claims 4, 6, 12 and 11 above. Newell '055 is applied to the claim as stated in the rejection of claim 11 above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Kessler whose telephone number is (571) 272-6510. The examiner can normally be reached on Mon-Fri, 9-5.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

csk


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